A NEW SPECIES OF *DIDOGOBIUS* (TELEOSTEI: GOBIIDAE) FROM THE WESTERN MEDITERRANEAN

by

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ABSTRACT. - *Didogobius splechtnai* sp. nov. is described from seven specimens collected at the Balearic Island Ibiza, western Mediterranean. The new species is assigned to *Didogobius* on the basis of the almost complete agreement in the pattern of cephalic sensory papillae. It differs from all other species of the genus in the combination of squamation, lateral-line system and fin features. Diagnostic values for the new species are D2 I/9-10, A I/9, P 15-16 and Ll 28-30. This small cryptobenthic gobiid fish was found in submerged caves at a depth of 7-11 m. A key to the species of the Mediterranean and eastern Atlantic genus *Didogobius* is provided.

RÉSUMÉ. - *Didogobius splechtnai* sp. nov. est décrit à partir de 7 spécimens collectés à Ibiza, îles Baléares, Méditerranée occidentale. Cette nouvelle espèce est rapportée au genre *Didogobius* dont elle possède presque entièrement la disposition des papilles des canaux sensoriels céphaliques. Elle diffère des autres aspèces du genre par des caractères méristiques portant sur l'écaillure, la ligne latérale et les nageoires. Les caractères distinctifs sont D2 I/9-10, A I/9, P 15-16 et Ll 28-30. Ce petit gobiidé cryptobenthique a été récolté dans une grotte submergée à 7-11 m de profondeur. Une clé des espèces méditerranéennes et est-atlantique du genre *Didogobius* est proposée.

Key-words. - Gobiidae, *Didogobius splechtnai*, MED, Balearic Islands, Key to species, Taxonomy, New species.

Our information on the biology and the habitats of especially small, cryptobenthic and/or nocturnal gobiid species in the Mediterranean are often few and limited (Miller, 1986, 1992; Ahnelt *et al.*, 1994). Such gobiids are still often overlooked or incorrectly synonymized. Therefore, even in an ichthyologically well-investigated sea like the Mediterranean, new gobiid species have been described frequently in the last decades (Miller, 1966, 1968, 1982, 1993; Bath, 1971; Zander and Jelinek, 1976).

Investigations in the smaller submerged caves on the Balearic island of Ibiza (Western Mediterranean) by one of us (RAP) have revealed not only many new data but also enlarged our knowledge of geographical distribution and biology of rarely found cryptobenthic gobiid species. For example one of these species, *Corcyrogobius liechtensteini*, was known until then only from the Adriatic Sea and has been reported for the first time since 1891 (Ahnelt *et al.*, 1994). Other specimens collected represent a new species, described below.

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METHODS AND ABBREVIATIONS

Meristics

A, anal fin; C, caudal fin; D1, D2, first and second dorsal fins; Ll, scales in lateral series; P, pectoral fin; V, pelvic disc.

Morphometrics (see Table I)

Ab, anal fin base; Ad and Aw, body depth and width at anal fin origin; Cl, caudal fin length; CHd, cheek depth; CP and CPd, caudal peduncle length and depth; D1b and D2b, first and second dorsal fin bases; E, eye diameter; H and Hw, head length and width;

Table I. - Body proportions of *Didogobius splechtnai*. Values for females are range and for males range, and, in parentheses, mean and standard deviation. See text for abbreviations.

Sex		Males		Females	
n		5		2	
SL (mm)		**19.4 - 22.7**		**22.7 - 28.1**	
%SL,	H	32.6-34.3	(33.6, 0.70)	30.4	31.1
	Hw	13.7-16.5	(15.2, 1.08)	16.8	14.6
	SN/D1	38.5-43.5	(41.5, 1.08)	40.3	37.3
	SN/D2	55.6-61.6	(58.6, 2.37)	57.4	56.7
	SN/AN	53.2-55.0	(53.8, 0.69)	56.4	54.6
	SN/A	56.9-59.2	(58.1, 0.86)	61.8	59.7
	SN/V	29.6-31.9	(30.8, 0.88)	34.3	30.8
	CP	19.2-21.5	(20.6, 1.07)	20.6	18.7
	D1b	16.3-19.8	(18.5, 1.40)	16.9	17.5
	D2b	22.9-24.6	(23.7, 0.70)	22.4	27.3
	Ab	15.9-20.4	(18.6, 1.79)	19.5	20.7
	Cl	22.3-28.9	(25.8, 2.71)	21.5	23.1
	Pl	31.4-32.7	(31.9, 0.61)	28.5	32.8
	Vl	27.5-30.4	(28.4, 1.14)	25.1	25.9
	Vd	15.8-17.2	(16.7, 0.56)	18.7	17.4
	Ad	14.6-16.6	(15.7, 0.84)	17.8	17.3
	Aw	8.4-9.7	(8.8, 0.62)	11.1	10.2
	CPd	10.4-11.8	(11.1, 0.58)	12.3	11.1
	V/AN	22.0-26.4	(24.5, 1.64)	23.4	26.4
%CP,	CPd	48.7-61.8	(54.3, 4.89)	59.6	60.1
%H,	SN	23.4-25.9	(24.2, 1.36)	27.1	29.0
	E	23.5-30.1	(26.8, 3.30)	24.6	25.9
	PO	48.9-52.8	(50.7, 1.59)	51.7	52.6
	CHd	12.1-18.8	(15.5, 3.39)	21.6	19.2
	Hw	42.1-49.2	(45.4, 2.70)	53.9	47.1
%E,	I	21.1-35.6	(28.4, 7.30)	21.2	32.3

I, interorbital width; Pl, pectoral fin length; PO, postorbital length; SL, standard length; SN, snout length; SN/A and SN/AN, distance from snout to vertical of anal fin origin and anus; SN/D1 and SN/D2, distance from snout to origin of first and second dorsal fins; SN/V, V/AN, distance from origin of pelvic spinous ray origin; Vd, body depth at origin of V I; Vl, distance from V I origin to tip of longest pelvic ray.

Lateral-line system

Terminology follows Sanzo (1911) and Miller (1986). Nomenclature of the transversal suborbital rows follows Miller (1992).

DIDOGOBIUS SPLECHTNAI SP. NOV.

(Fig. 1, 2)

Material

Holotype. - NMW-92804, male, standard length 22.7 + caudal fin length 5.1 mm, from near Portinatx, Ibiza island, Balearic Islands, Spain; leg. R.A. Patzner, Sept. 1991.

Paratypes. - 4 males, 19.4 + 5.1-20.7 + 5.4 mm and 2 females, 27.7 + 5.9-28.1 + 6.4 mm, from the same locality; leg. R.A. Patzner; Sept. 1992, Sept. 1993.

The holotype and three paratypes (NMW-92805) are deposited at the Naturhistorisches Museum Wien, and three paratypes are retained in the collection of the senior author, University Vienna.

Name

splechtnai. The new species is named for Univ. Prof. Dr. Heinz Splechtna, in recognition of his efforts to show for decades the diversity of marine organisms to generations of students.

Generic identification

The genus *Didogobius* shows close affinities with the Mediterranean gobiid genus *Chromogobius* (Van Tassel, 1988; Miller, 1992). It differs mainly in the pattern of the head neuromasts (six infraorbital transverse rows, four before row *b*, instead of seven and five before row *b*).

Didogobius splechtnai differs from the other two Mediterranean and the one eastern Atlantic species (features in parantheses) of this genus in (1) a lower scale count 28-30 (40-70), (2) cycloid scales only on anterior bodysides (all scales cycloid), (3) lower D2 and A branched fin-ray count, D2 I/9-10 and A I/9 (D2 I/12-14, A I/11-12), and (4) V4 longest ray of emarginate V (V5 longest ray of rounded V). On the basis of its almost complete agreement in the pattern of cephalic sensory papillae the new species is included by us within the genus *Didogobius* rather than to errect a new genus. All together 12 specimens are known from the four described species of this genus. Two species are only known from a single specimen each. To less to know the range of the features within this species.

Specific identification

In possession of a preopercular canal, the new species is symplesiomorphic with the Canarian *Didogobius kochi* and the Adriatic *D. schlieweni*. The present form is much closer to *D. kochi* and *D. schlieweni*, all three are clearly distant from the eastern Mediterranean *D. bentuvii* which possesses not only (1) shortened anterior oculoscapular canals, (2) no

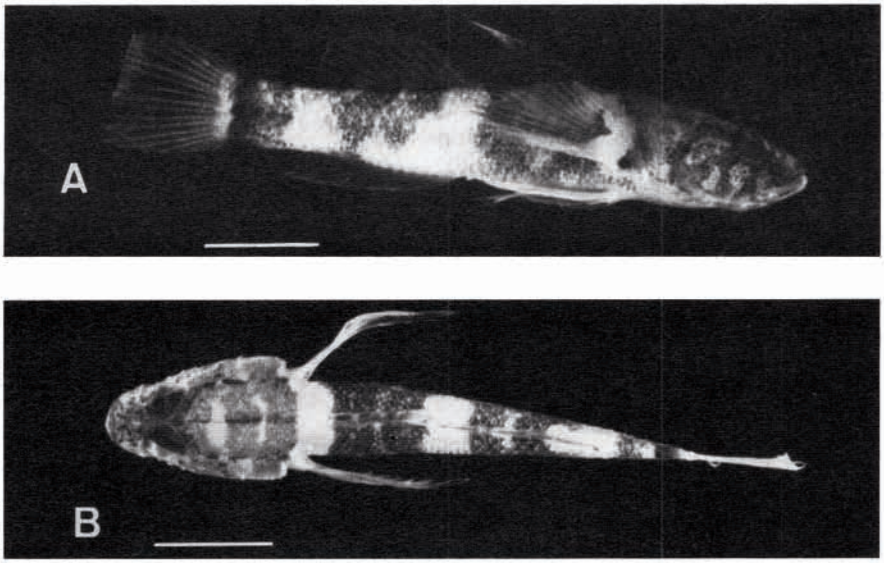

Fig. 1. - *Didogobius splechtnai* sp. nov., male, holotype, 22.7 + 5.1 mm (NMW-92804), in lateral (A) and dorsal (B) views. Scale bar = 5 mm.

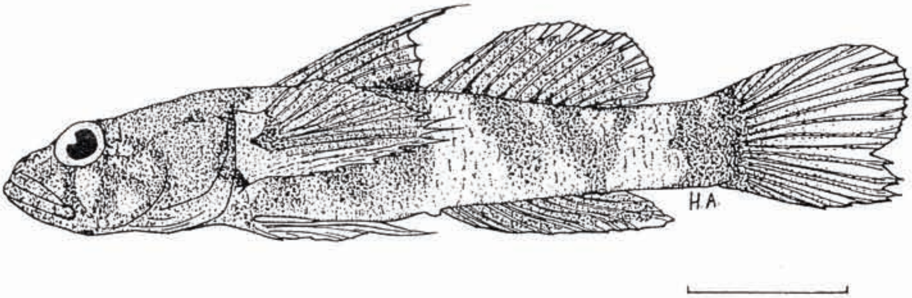

Fig. 2. - *Didogobius splechtnai* sp. nov., male, holotype, 22.7 + 5.1 mm (NMW-92804), in lateral view. Scale bar = 5 mm.

pore β and (3) distinctly more scales in lateral series but (4) also a pale coloration. For a more detailed comparison see Miller (1992). The coloration of the new species differs clearly from that of *D. schlieweni* and *D. kochi*. It is not predominantly dark with smaller pale markings, but is characterized by dark-brown transverse bands which alternate with whitish interspaces. The scales, except on the anterior most part of the body, are ctenoid in *D. splechtnai* and fewer in lateral series than in the closest related species, *D. kochi*. The shape of the first dorsal fin is in both sexes of the new species distinctly different from those of all other known species of the genus. The rays of D1 become gradually shortened to its rear end, the first ray is elongated in both sexes.

General description

Body proportions are given in table I. For other features than those given below, see features noted under Generic and Specific Identification. Body moderately elongate; head depressed, interorbital space narrow; eyes dorso-lateral and large; body covered mainly with ctenoid, anteriormost with cycloid scales; head and nape naked; snout longer than eye; upper lip twice preorbital distance; mouth oblique, lower jaw slightly projecting; posterior angle of jaws below anterior half of eye; anterior nostril tubular, long, at least reaching lower lip when depressed, without process from rim; branchiostegous membrane attached to isthmus; rays of P with pronounced tips, but none free from membrane; V complete, posteriorly emarginate; C rounded, shorter than head; anterior oculo-scapular canal of the cephalic lateral-line system with all pores (σ, λ, χ, ω, α, β and ρ); posterior oculo-scapular canal absent; preopercular canal present; six transverse suborbital rows of sensory papillae, the last represented by one papilla at pore α; four rows before longitudinal row *b*, one below; longitudinal oculo-scapular row *x*1 reaching at least anteriorly to above pore β; row *g* ending anteriorly in advance of row *o*.

Fins

D1 VI; D2 I/9-10 (9: 1, 10: 6); A I/9; C (branched rays) 13-15 (13: 2, 14: 4, 15: 1); P 15-16 (15: 5, 16: 2); V I/5 + 5/I. D1 with rays progressively less elongate; when depressed, all D1 rays in males and females extend to at least D2 1; D1 I to nearly middle of D2 base (D2 4), D1 VI to D2 1 or to origin of D2. Interdorsal space membranous. D2 and A posterior tip do not extend to origin of C in males and females. P without free rays; tip below D2 2. V4 longest ray reaches genital papilla, V5 somewhat shorter; rear margin of V emarginate; anterior pelvic membrane well developed, lacking lateral lobes. C rear edge rounded; shorter than head.

Scales

Body with cycloid and ctenoid scales. Cycloid scales on breast, abdomen and back to about origin of D2. Predorsal area (forward of line from upper origin of P to D1 origin) naked. Ctenoid scales from below P, covering entire body from D2 and A origin rearwards to origin of C; 28-30 in Ll from axilla (28: 2, 29: 4, 30: 1); first 3 or 4 rows cycloid (3: 6, 4: 1), following 25-26 ctenoid (25: 2, 26: 5). Upper and lower scales at C origin not greatly enlarged.

Coloration

In life (from transparency) brownish, with four dark-brown transverse bands and three narrower whitish interspaces across nape and body. First band across nape to lower third of opercle and origin of P lobe; second from D1b to abdomen; third from posterior four fifth of D2b slightly rearwards to Ab; fourth across posterior half of Cp, not overlapping origin of C. First whitish interspace across predorsal area, immediately in front of D1 to ventral border of P lobe; second from anterior fifth of D2b to anterior part of Ab; third across somewhat anterior half of C. From dorsal all four dark bands show in their centre a narrow whitish band which divides them on the back in two symetrical parts. Preserved the dark-brown colour is somewhat less colorful. No distinct sexual dimorphism is evident in coloration.

Lateral-line system (Fig. 3, 4)

As in general description; numbers of papillae given in table II. Head with anterior oculo-scapular and preopercular canals, with pores σ, λ, χ, ω, α, β, ρ and γ, δ, ε

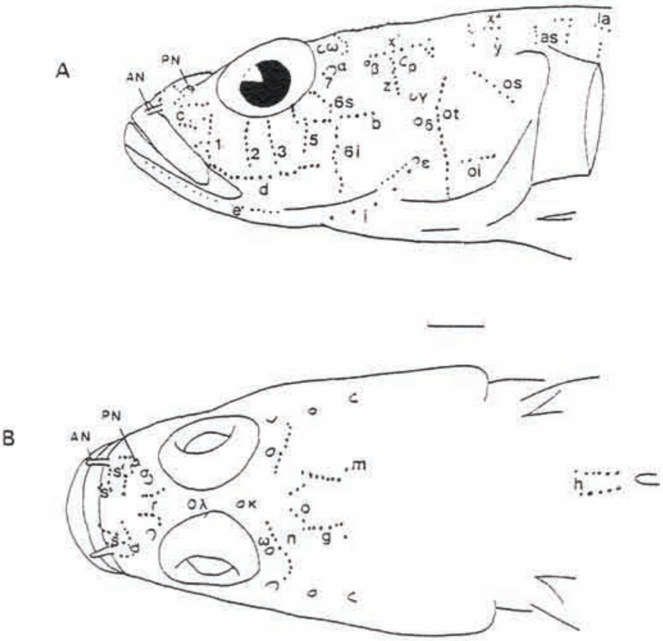

Fig. 3. - *Didogobius splechtnai* sp. nov. Head lateral-line sensory papillae and canal pores (greek lettering) of holotype, in left lateral (A), and dorsal (B) views. AN, PN, anterior and posterior nostrils; see other abbreviations in text. Scale bar = 1 mm.

SL (mm) 19.4 - 28.1 n=7					
PO			OS		
	r	3-5		x1	8-11
	s1	3-5		x2	3
	s2	2-3		z	6-8
	s3	3-4		q	1-3
	c2	4-5		y	1-2
	c1	1-2		as1	3-5
	c2	3-4		as2	2-5
	c1	1-3		as3	3-4
				la1	2-4
SO				la2	3-4
	1	5-7			
	2	5-7	OP		
	3	5-8		ot	15-20
	5	10		os	5-10
	6s	4-6		oi	4-6
	6i	8-10			
	7	1	AD		
	b	7-9		n	7-10
	d	15-18		g	7
				o	3-6
PM				m	1-2
	e	35-41		h	4-6
	f	14-15			
	i	8-12			

Table II. - Numbers of sensory papillae in head lateral-line system of *Didogobius splechtnai*. Series of sensory papillae: AD, anterior dorsal; OP, opercular; OS, oculoscapular; PM, preoperculo-mandibular; PO, postorbital; SO, suborbital.

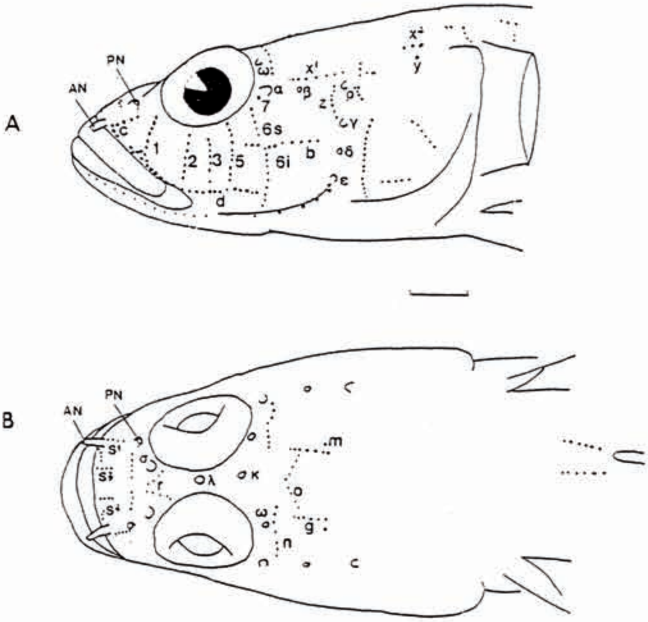

Fig. 4. - *Didogobius splechtnai* sp. nov. Head lateral-line sensory papillae and canal pores of paratype, female, in left lateral (A), and dorsal (B) views. AN, PN, anterior and posterior nostrils; see other abbreviations in text. Scale bar = 1 mm.

respectively; no posterior oculo-scapular canal. The present new species has six transverse rows of suborbital sensory papillae from the orbit. In the terminology of these papillae we follow Miller (1992). Nevertheless it shoud be noted that in *D. splechtnai* these infraorbital rows could be interpreted in two other ways: (1) row 1-4 before row *b*, row 5 separated by row *b* in a shorter upper (*5s*) and a longer lower portion (*5i*), with row 6 absent; or (2) row 5 absent, and rows 1-4 and *6s*, *6i* developed. But, as explained by Miller (1992), the homologies of these infraorbital rows are far from settled. Posterior lateral rows on trunk: *ld* (flanking D1) with 5-6 papillae; *ltm* 19-20 rows, each of 3-7 papillae, along lateral midline to C origin; *lv* three ventrolateral transverse rows, each of 3-5 papillae, along abdomen. Three rows along C rays, 11-17 papillae each.

Biology

Didogobius splechtnai is known only from the Balearic island of Ibiza, Spain, in the western Mediterranean. The seven specimens were found in submerged caves at a depth of 7-11 m. In three cases they were associated with another cryptobenthic gobiid species, *Corcyrogobius liechtensteini*. While the latter species settles on the walls of the caves, *D. splechtnai* was found on the bottom. Caves may be small, with a diameter of 10 cm and 15 to 20 cm deep or much larger with a diameter of about 1 m and approximately 4 m deep. The cryptobenthic habitat does not facilitate easy detection of this species. It is expected to occur also in other parts of the Mediterranean, at least in the western basin. Nevertheless investigations by one of us (RAP) in comparable habitats on the island of Elba and in the Banyuls area (France), north east of Barcelona (Spain), did not reveal any *D. splechtnai*.

Key to species of *Didogobius*

Species illustrated by Miller (1986, 1992) and Van Tassel (1988).

1a. Ll 65-70; D2 I/14; A I/12; no preopercular canal; coloration pale .... *D. bentuvii*
1b. Ll less than 60; D2 I/9-12; A I/9-11; preopercular canal with three pores; nape with rear pale band 2
2a. Ll 55-56; head and body predominantely uniformly dark, fins black proximally; back with three white spots; P black, with white spot in middle base .... *D. schlieweni*
2b. Ll less than 50; head and body predominantely brownish with several pale saddles or interspaces at least below D2; P and V transparent; P with dark marks 3
3a. Ll 33-37; D2 I/12; A I/11; predorsal scales present; P 18-19; V rounded; D1 I shorter than D1 II; coloration with three pale saddles below D2 base .... *D. kochi*
3b. Ll 28-30; D2 I/9-10; A I/9; predorsal scales absent; P 15-16; V emarginate; D1 I elongate, longer than D 1 II; coloration with four dark-brown transverse bands ....
.... *D. splechtnai* sp. nov.

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